WHAT IS CLAIMED IS:

1. A magnetic recording/reproducing apparatus using a perpendicular magnetic recording double-layer film medium with a soft underlayer and a reproducing head constituted by a magneto-resistive effect head with a shield film, said apparatus comprising a partial-response equalization circuit having frequency characteristic of cutting off low-frequency signal components inclusive of DC components, and a maximum-likelihood decoder, wherein a reproduced signal outputted from said reproducing head is processed by said partial-response equalization circuit and then inputted into said maximum-likelihood decoder to be data-reproduced.

2. A magnetic recording/reproducing apparatus according to Claim 1, wherein: reproduced signal waveforms corresponding to a pair of closest two recording transitions recorded on said recording medium at a shortest bit-length interval are outputted as signal waveforms having intersymbol interference of an amplitude ratio of (a1, a2, a3, ..., ak, ... an) (in which k is an integer indicating a bit-interval time, and a1 and an are non-zero real numbers satisfying the relation: a1 + a2 + a3 ... + ak + ... + an = 0) at each bit-interval through said partial-response equalization circuit; and said reproduced signal waveforms are inputted into said maximum-likelihood decoder for data reproduction.

3. A magnetic recording/reproducing apparatus according to claim 2, wherein a1 and an are non-zero real numbers satisfying the relation: a1 + a2 + a3 ...+ ak + ... + an = 0: n ≧ 5) at each bit-interval through said partial-response equalization circuit.

4. A magnetic recording/reproducing apparatus according to Claim 2, wherein: reproduced signal waveforms corresponding to a pair of the closest two recording transitions recorded on said recording medium at a shortest bit-length interval are outputted as signal waveforms having intersymbol interference of an amplitude ratio of (a1, a2, a3-a1, ..., ak-ak-2, ..., an-an-2, -an-1, -an) (in which k is an integer indicating a bit-interval, and a1 and an are non-zero real numbers) at each bit-interval through said partial-response equalization circuit; and said reproduced signal waveforms are inputted into said maximum-likelihood decoder for data reproduction.

5. A magnetic recording/reproducing apparatus according to claim 4, wherein a1 and an are non-zero real numbers satisfying the relation: a1 + a2 + a3 ... + ak + ... + an = 0: n ≧ 5) at each bit-interval through said partial-response equalization circuit.

6. A magnetic recording/reproducing apparatus according to Claim 4, wherein a1, a2 and a1 take an integer ratio of a1 = 4, a2 = 3 and a3 = 2.

7. A signal processing circuit mounted on a perpendicular magnetic recording/reproducing apparatus

using a perpendicular magnetic recording double-layer film medium with a soft underlayer and a reproducing head constituted by a magneto-resistive effect head with a shield film, said signal processing circuit comprising a partial-response equalization circuit having frequency characteristic of cutting off low-frequency signal components inclusive of DC components, and a maximum-likelihood decoder, wherein a reproduced signal outputted from said reproducing head is processed by said partial-response equalization circuit and then inputted into said maximum-likelihood decoder to be data-reproduced.

8. A signal processing circuit according to Claim 7, wherein: reproduced signal waveforms corresponding to a pair of the closest two recording transitions recorded on said recording medium at a shortest bit-length interval are outputted as signal waveforms having intersymbol interference of an amplitude ratio of (a1, a2, a3, ..., ak, ... an) (in which k is an integer indicating a bit-interval, and a1 and an are non-zero real numbers satisfying the relation: a1 + a2 + a3 ... + ak + ... + an = 0) at each bit-interval time through said partial-response equalization circuit; and said reproduced signal waveforms are inputted into said maximum-likelihood decoder for data reproduction.

9. A signal processing circuit according to Claim 8, wherein: reproduced signal waveforms

corresponding to a pair of the closest two recording transitions recorded on said recording medium at a shortest bit-length interval are outputted as signal waveforms having intersymbol interference of an amplitude ratio of (a1, a2, a3-a1, ..., ak-ak-2, ..., an-an-2, -an-1, -an) (in which k is an integer indicating a bit-interval, and a1 and an are non-zero real numbers) at each bit-interval through said partial-response equalization circuit; and said reproduced signal waveforms are inputted into said maximum-likelihood decoder for data reproduction.

10. A magnetic recording/reproducing apparatus according to claim 9, wherein a1 and an are non-zero real numbers satisfying the relation: a1 + a2 + a3 ... + ak + ... + an = 0: n $\geqq$ 5) at each bit-interval through said partial-response equalization circuit.

11. A signal processing circuit according to Claim 9, wherein a1, a2 and a2 take an integer ratio of a1 = 4, a2 = 3 and a3 = 2.

12. A signal processing circuit according to Claim 7, wherein said partial-response equalization circuit is constituted by a transversal filter in which filter tap coefficients are changed or adjusted so that the sum of said tap coefficients is zero.

13. A semiconductor integrated circuit comprising a signal processing circuit according to Claim 7, wherein said signal processing circuit is mounted on said semiconductor integrated circuit.

14. A magnetic recording/reproducing apparatus comprising a semiconductor integrated circuit according to Claim 13, wherein said semiconductor integrated circuit is mounted on said magnetic recording/reproducing apparatus.